

CLAIMS

What is claimed is:

1. A detection circuit for detecting data in a read data signal generated by a head of a perpendicular recording system, the read data signal including at least one of data and transients, a transient detect signal indicative of one of the transients, the detection circuit comprising:

a first path comprising a filter and a first data detector responsive to the filter;

the filter to generate a filtered data signal in which low frequency components of the read data signal are attenuated;

the first data detector, operable for detecting data in the filtered data signal, to generate a first detected data signal;

a second path including a second data detector, operable for detecting data in the read data signal, to generate a second detected data signal; and

a switch, controllable in response to the transient detect signal, to select either the first detected data signal when the transient detect signal indicates a transient is detected or the second detected data signal to a data processor when the transient detect signal does not indicate a transient is detected.

2. The detection circuit of Claim 1 further including a forward equalizer for attenuating intersymbol interference in the read data signal.
3. The detection circuit of Claim 1 wherein the first data detector is a DFE detector.
4. The detection circuit of Claim 1 wherein the second data detector is a Viterbi detector.
5. The detection circuit of Claim 1 wherein the filter has a high pass filter characteristic.
6. The detection circuit of Claim 1 wherein the filter has a 1-D filter characteristic.
7. The detection circuit of Claim 1 further including a transient detector, responsive to the transient in the read data signal, to generate the transient detect signal.
8. The detection circuit of Claim 1 wherein the second data detector is disabled during the transient.

9. The detection circuit of Claim 1 wherein the first data detector is a DFE detector;

wherein the second data detector is a Viterbi detector; and

wherein the data filter has a high pass filter characteristic.

10. A method of detecting data in a read data signal generated by a head of a perpendicular recording system, comprising the steps of:

monitoring the read data signal for a transient;

attenuating low frequency components in the read data signal such that a filtered data signal is generated;

detecting data in the filtered data signal; and

generating a first detected data signal from the filtered data signal;

detecting data in the read data signal; and

generating a second detected data signal from the read data signal;

in response to detecting the transient, generating a transient detect signal; and

selecting either the first detected data signal or the second detected data signal based upon the transient detect signal.

11. The method of Claim 9 further including the step of attenuating intersymbol interference in the read data signal.

12. The method of Claim 9 further including the step of converting the read data signal to digitized data.
13. The method of Claim 9 further including the step of decoupling the read data signal from the first detector during a transient.

14. A detection circuit for detecting data in a read data signal generated by a head of a perpendicular recording system, comprising:

means for detecting a transient in the read data signal, to generate a transient detect signal;

first data detecting means responsive to the read data signal, for attenuating low frequency components of the read data signal and detecting data in the read data signal, to generate a first detected data signal;

second data detecting means coupled to an output of the channel circuit for detecting data in the read data signal, to generate a second detected data signal; and

switch means for selecting either the first detected data signal when the transient detect signal indicates a transient is detected or the second detected data signal to a data processor when the transient detect signal does not indicate a transient is detected.

15. The detection circuit of Claim 14 further including a means for attenuating intersymbol interference in the read data signal.

16. The detection circuit of Claim 14 wherein the first data detecting means includes filtering means for attenuating low frequency components in the read data signal and a DFE detector.

17. The detection circuit of Claim 16 wherein the filtering means has a high pass filter characteristic.
18. The detection circuit of Claim 14 wherein the second data detecting means is a Viterbi detector.
19. The detection circuit of Claim 14 wherein the second data detecting means is disabled during the transient.
20. The detection circuit of Claim 14 wherein the transient detecting means delays a predetermined time period after the transient before resetting the transient detect signal to indicate no transient is detected.

21. A detection circuit for detecting data in a read data signal generated by a head of a perpendicular recording system, comprising:

a transient detector, responsive to detecting a transient in the read data signal, to generate a transient detect signal;

a data filter, responsive to the read data signal, to generate a filtered data signal in which low frequency components of the read data signal are attenuated;

a data detector, operable to detect data in either the read data signal or the filtered data signal, to generate a detected data signal; and

a switch, controllable in response to the transient detect signal, to bypass the data filter when the transient detect signal does not indicate a transient is detected.

22. The detection circuit of Claim 21 further including a channel circuit to amplify the read data signal.

23. The detection circuit of Claim 21 wherein the data detector is selected from the group of DFE detectors and Viterbi detectors.

24. The detection circuit of Claim 21 wherein the data filter has a high pass filter characteristic.

25. The detection circuit of Claim 22 wherein the channel circuit includes:

- a sampler to convert the read data signal to a digitized signal; and
- a finite impulse response filter to filter the digitized signal.

26. The detection circuit of Claim 21 wherein the transient detector, further in response to detecting approximately an absence of the transient in the first detected data signal, sets the transient detect signal to indicate no transient is detected.

27. A detection circuit for detecting data in a read data signal generated by a head of a perpendicular recording system, comprising:

means for detecting a transient in the read data signal, to generate a transient detect signal;

means for filtering, responsive to the read data signal, for generating a filtered data signal;

detecting means for detecting data in either the filtered data signal or the read data signal, to generate a detected data signal; and

means for switching being controllable in response to the transient detect signal, to bypass the filtering means when the transient detect signal does not indicate a transient is detected.

28. The detection circuit of Claim 27 further including a means for amplifying the read data signal.

29. The detection circuit of Claim 27 wherein the first data detecting means includes filtering means for attenuating low frequency components in the read data signal and a DFE detector.

30. The detection circuit of Claim 29 wherein the filtering means has a high pass filter characteristic.

31. The detection circuit of Claim 27 wherein the detecting means is selected from the group of DFE a detector and a Viterbi detector.

32. The detection circuit of Claim 27 wherein the transient detecting means delays a predetermined time period after the transient before resetting the transient detect signal to indicate no transient is detected.

33. A computer program of detecting data in a read data signal generated by a head of a perpendicular recording system, comprising the steps of:

- monitoring the read data signal for a transient;
- attenuating low frequency components in the read data signal such that a filtered data signal is generated;
- detecting data in the filtered data signal; and
- generating a first detected data signal from the filtered data signal;
- detecting data in the read data signal; and
- generating a second detected data signal from the read data signal;
- in response to detecting the transient, generating a transient detect signal; and
- selecting either the first detected data signal or the second detected data signal based upon the transient detect signal.

34. The computer program of Claim 33 further including the step of attenuating intersymbol interference in the read data signal.

35. The computer program of Claim 33 further including the step of converting the read data signal to digitized data.

36. The computer program of Claim 33 further including the step of decoupling the read data signal from the first detector during a transient.

37. A detection circuit for detecting data in a read data signal generated by a head of a perpendicular recording system, comprising:

 a transient detector to detect a transient in the read data signal, to generate a transient detect signal;

 a first path comprising a filter and a first data detector responsive to the filter;

 the filter to generate a filtered data signal in which low frequency components of the read data signal are attenuated;

 the first data detector, operable for detecting data in the filtered data signal, to generate a first detected data signal;

 a second path including a second data detector, operable for detecting data in the read data signal, to generate a second detected data signal;
and

 a switch, controllable in response to the transient detect signal, to select either the first detected data signal when the transient detect signal indicates a transient is detected or the second detected data signal to a data processor when the transient detect signal does not indicate a transient is detected.

38. The detection circuit of Claim 37 further including a forward equalizer for attenuating intersymbol interference in the read data signal.

39. The detection circuit of Claim 37 wherein the first data detector is a DFE detector.

40. The detection circuit of Claim 37 wherein the second data detector is a Viterbi detector.

41. The detection circuit of Claim 37 wherein the filter has a high pass filter characteristic.

42. The detection circuit of Claim 37 wherein the filter has a 1-D filter characteristic.

43. The detection circuit of Claim 37 further including a channel circuit to amplify the read data signal.

44. The detection circuit of Claim 37 wherein the second data detector is disabled during the transient.

45. The detection circuit of Claim 37 wherein the first data detector is a DFE detector;

wherein the second data detector is a Viterbi detector; and

wherein the filter has a high pass filter characteristic.

46. A detection circuit for detecting data in a read data signal generated by a head of a perpendicular recording system, the read data signal including at least one of data and transients, a transient detect signal indicative of one of the transients, the detection circuit comprising:

first data detecting means responsive to the read data signal, for attenuating low frequency components of the read data signal and detecting data in the read data signal, to generate a first detected data signal;

second data detecting means responsive to the read data signal for detecting data in the read data signal, to generate a second detected data signal; and

switch means for selecting either the first detected data signal when the transient detect signal indicates a transient is detected or the second detected data signal to a data processor when the transient detect signal does not indicate a transient is detected.

47. The detection circuit of Claim 46 further including a means for attenuating intersymbol interference in the read data signal.

48. The detection circuit of Claim 46 wherein the first data detecting means includes filtering means for attenuating low frequency components in the read data signal and a DFE detector.

49. The detection circuit of Claim 16 wherein the filtering means has a high pass filter characteristic.

50. The detection circuit of Claim 46 wherein the second data detecting means is a Viterbi detector.

51. The detection circuit of Claim 46 wherein the second data detecting means is disabled during the transient.

52. The detection circuit of Claim 46 wherein the transient detecting means delays a predetermined time period after the transient before resetting the transient detect signal to indicate no transient is detected.

53. A method of detecting data in a read data signal generated by a head of a perpendicular recording system, comprising the steps of:

- a) monitoring the read data signal for a transient;
- b) attenuating low frequency components in the read data signal

such that a filtered data signal is generated; and

- c) detecting data

in the filtered data signal if a transient is detected in step (a);

or

in the read data signal if a transient is not detected in step

(a) to generate a detected data signal.

54. The method of Claim 53 further including the step of attenuating intersymbol interference in the read data signal.

55. The method of Claim 53 further including the step of converting the read data signal to digitized data.

56. A computer program of detecting data in a read data signal generated by a head of a perpendicular recording system, comprising the steps of:

- a) monitoring the read data signal for a transient;
- b) attenuating low frequency components in the read data signal such that a filtered data signal is generated; and
- c) detecting data

in the filtered data signal if a transient is detected in step (a);

or

in the read data signal if a transient is not detected in step (a) to generate a detected data signal.

57. The computer program of Claim 56 further including the step of attenuating intersymbol interference in the read data signal.

58. The computer program of Claim 56 further including the step of converting the read data signal to digitized data.